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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/525,919	03/31/2006	Yoshihiko Nagata	5703-008/NP	4133

27572 7590 05/16/2008

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EXAMINER	
GANESAN, SUNDHARA M	
ART UNIT	**PAPER NUMBER**
3764	
MAIL DATE	**DELIVERY MODE**
05/16/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/525,919	NAGATA ET AL.	
	Examiner	Art Unit	
	SANDHARA M. GANESAN	3764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 February 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 10 is rejected under 35 U.S.C. 102(b) as being anticipated by Allum (US Pat. 6,063,046). Allum shows the device as having a plate (48) configured to carry a user (Fig. 2), a motor (58) with a revolving shaft attached to the plate and driving the plate so as to provide the plate with a tilting motion around an axis of rotation of the revolving shaft (axis 54, described in col. 11, lines 40-46). Allum shows a rotation angle sensor configured to measure a rotation angle as the plate is tilted around the axis of rotation of the revolving shaft (col. 11, lines 59-62, "in the pitch and roll directions"). Allum shows a torque measuring mechanism configured to measure torque applied to the plate based on the motion of the user (Col. 12, lines 61-65). Allum further shows a kinetic model analyzer (col. 10, lines 6-10) into which an output from each of the rotation angle sensor (col. 12, lines 10-15) and the torque measuring mechanism (Col. 12, lines 19-22) is inputted. The processor (24) described by Allum is configured to determine a target rotation angle (col. 12, lines 19-22). The Allum device further shows a motor controller (24, col. 10, lines 2-4) configured to control the motor so that the plate is tilted at the target rotation angle determined by the kinetic model analyzer (Col. 11, lines 40-42, "the servo-mechanical support surface control structure 56 is capable of rotating the

support surface 52 about the rotational axis 54"; and Col. 12, lines 10-15, "the measured angular displacement of the support surfaces 48 and 52 in the pitch and roll directions, respectively, are used by the system processor 24 to control the angular displacement of the support surfaces".)

Regarding claim 11, Allum describes the plate as rotating around an axis of rotation extending in parallel with the top surface of the plate (axis 54, see Figs. 4-5).

Regarding claim 13, Allum shows the top surface of the plate as being spaced apart by a certain distance from the center of the axis of rotation (see Figs. 4-5).

Regarding claims 14 and 19, Allum describes the torque measuring mechanism as having a pair of force plates (col. 12, lines 38-40) each comprising an integrated sensor unit. Allum describes a pair of fore and aft force transducer pairs that are utilized to calculate the resultant forces acting at the subject's center of gravity (col. 12, lines 42-50), which measures force and a position of a center of loading, as required by claims 14 and 19.

Regarding claim 18, Allum describes the balance training device as providing the training independently and exclusively directed to each one of three organs, including a semicircular canal, vision, and deep sensibility (see Fig. 1, subject feedback is provided in visual, auditory, tactile, and electro-vestibular manners).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Allum (US Pat. 6,063,046) in view of an obvious design choice.

Allum does not disclose expressly the top surface of the plate as coinciding with a plane containing a center of the axis of rotation.

At the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to space the top surface of the place such that it coincides with a plane containing a center of the axis of rotation, because applicant has not disclosed that doing so provides an advantage, is used for a particular purpose, or solves a stated problem. Furthermore, one of ordinary skill in the art would have expected Allum's balancing device, and applicant's invention, to perform equally well with either the spacing taught by Allum or the claimed coincident top surface and axis of rotation, because both spacing dimensions would perform the same function of perturbing a balance platform.

Therefore, it would have been prima facie obvious to modify Allum to obtain the invention as specified in claim 12, because such a modification would have been

considered a mere design consideration which fails to patentably distinguish over the prior art of Allum.

Claim 15 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allum (US Pat. 6,063,046) in view of Orman et al. (US Pat. 4,785,674). Allum describes the invention substantially as claimed, as described in the 35 USC 102(b) rejections above. Allum does show a potentiometer (80) mounted on the shaft of the motor, but does not describe using it for torque sensing.

Allum does not expressly disclose a torque sensor mounted on a shaft of the motor.

Orman et al. teach a torque sensor for mounting on a shaft of an exercise machine, which employs a sensor such as a strain gauge, which deforms and produces an electrical signal that is proportional to the force.

Allum and Orman et al. are analogous art because they are from the same field of endeavor.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to utilize the device of Orman et al. to sense torque on the shaft of the motor of Allum's device. This would be obvious because Allum employs a deformation sensor (potentiometer 80) on the shaft of the motor already, and envisions the use of alternate conventional torque measurement systems (col. 12, lines 58-61).

The suggestion or motivation would have been to employ an alternate method of torque sensing, perhaps as a redundant element to ensure that ankle torque estimations by the force transducers on the footplates are indeed accurate.

Therefore, it would have been obvious to combine Allum with Orman et al. to obtain the invention as specified in claims 15 and 20

Claims 16-17 and 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allum (US Pat. 6,063,046) in view of Girone et al (US Pat. 6,162,189). Allum describes the invention substantially as claimed, as described in the 35 USC 102(b) rejections above. Allum does show a system processor (24) as being controlled to transform response measure signals to perturb the platform (col. 10, lines 1-10). Allum further shows an angle sensor (80) which is used to provide information to the system processor (24), which in turn controls the motor and the perturbations of the platform.

Allum does not specifically disclose the use of a kinetic model analyzer characterized in that a motion of the plate is defined by a spring constant, a viscous braking coefficient, and a moment of inertia, or an angle of equilibrium that is arithmetically determined.

Girone et al. describe a balance system which utilizes a kinetic model to control perturbation of a balance platform. In Fig. 9c, Girone et al show a kinematics step (125) in a control diagram. Modeling a system such as that described by Girone et al. by means of a spring constant, a viscous braking coefficient, a moment of inertia, or an angle of equilibrium is taught by any basic mechanical modeling text. For example,

Stengel (Modeling Dynamic Systems. Robotics and Intelligent Systems, Lecture 7. Princeton University (2005).) shows a summary of common mechanical modeling techniques.

Allum and Girone at al are analogous art because they are form the same field of endeavor.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to employ a kinematic model analyzer as taught by Girone et al. in the device of Allum.

The suggestion or motivation would have been to provide an accurate control pattern for the motor to perturb the balance platform for rehabilitative purposes.

Therefore, it would have been obvious to combine Girone et al. and Allum to obtain the invention as specified in claims 16-17 and 21-25.

Response to Arguments

Applicant's arguments filed 02/18/2008 have been fully considered but they are not persuasive. Applicant argues that Allum does not show a motor controller configured to control the motor so that the plate is tilted at the target rotation angle determined by the kinetic model analyzer. Allum discloses this in Col. 11, lines 40-42, “the servo-mechanical support surface control structure 56 is capable of rotating the support surface 52 about the rotational axis 54”; and Col. 12, lines 10-15, "the measured angular displacement of the support surfaces 48 and 52 in the pitch and roll directions, respectively, are used by the system processor 24 to control the angular displacement

of the support surfaces". Further, Allum states in Col. 12, lines 19-22, "the system processor 24 receives balance correction response measurements from three response measurement sources". The phrase "balance correction response measurements" reveals that measurements are taken from the device and inputted into some form of a kinetic model to generate a "balance correction" (which includes perturbations of the foot plate) in the system.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SANDHARA M. GANESAN whose telephone number is (571)272-3340. The examiner can normally be reached on 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, LoAn Thanh can be reached on (571) 272-4966. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. M. G./
Examiner, Art Unit 3764

/LoAn H. Thanh/
Supervisory Patent Examiner, Art Unit 3764